FACTORS INFLUENCING TECHNOLOGY INVESTMENT DECISION ON COCOA PROCESSING OPERATION IN NIGERIA

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Abstract

Agriculture occupies a prominent place in the economy of Nigeria. Cocoa produce is the single agricultural export commodity that has earned foreign exchange more than other crops. The crop is an important export and cash crop grown in some selected states and a major economic tree crop in Nigeria. It provides jobs and income to farmers until recently, its production has continued to decline over time due to a combination of several factors. The development of cocoa processing industries is very important and situation where the bulk of the cocoa beans produced in a country cannot be processed locally, is not in the best interest of any country. This study examined the factors influencing technology investment decision in cocoa processing operation in Nigeria. A purposive sampling techniques was use to select a representative number from the population of 130 Cocoa processors in Oyo state of Nigeria, out of which 108 were retrieved and analyzed for the study. Descriptive statistical methods such as frequency counts and percentages were used to analyzed socio-geographical characteristics of the respondents and correlation analysis was used as inferential statistic. The result revealed that decision to invest in plant machinery is positively affected by political trend, consumer trend, market competition, improved production, technology change, human resource and funding (Mean > 3.50). Correlation analysis shows that access to funds has a strong relationship ($p<0.05$) with probability of farmers investing in cocoa processing technologies. Given the above findings, it was thus concluded that funding is the main determinant for farmers investment decision in cocoa processing technology. The study therefore recommended that government and developmental support agencies should give special consideration to cocoa processors through specialized financial institutions or models in order to give leverage to the cocoa processors to afford the funding required to acquire machineries that would enhance production capacity of the cocoa farmers.

Keywords: *Influencing factors, Technology, Investment decision, Cocoa, processing operation*

Introduction

Agricultural sector is critical to the development of a national economy, including Nigeria and Cocoa is the single agricultural export commodity that has earned foreign exchange more than other crops (Dongo, Aigbekaen, Jayeola, Emaku & Orisajo 2009). It also offers employment to many people, both directly and indirectly, and serves as an important source of raw materials, and source of revenue to governments of cocoa producing states (Fadipe, Adenuga & Ilori 2012). It is also the largest non-oil export earner, a

key contributor to wealth creation and poverty reduction, and one of the largest employers of labor (NEPC 2016; Central Bank of Nigeria, 2015).

Among cocoa exporters in the world, Nigeria was ranked as one of the leading cocoa producing countries and no single agricultural export commodity has earned more than cocoa (NEPC, 2016). But today, the crop as diminished. There are reports of low productivities from cocoa farms in the country among other problems (Noko, 2016). Due to low productivity, cocoa has declined in economic importance at the aggregate national level (NEPC, 2016).

Such uncertainties in productivity of a very important export crop like cocoa, calls for concern and gives threatening signals to realizing the sustainability potentials of the sub-sector.

According to the International Cocoa Organization (ICCO) ranking, Nigeria was ranked as the fourth largest producer in 2014 after Cote D'ivoire, Ghana and Indonesia based on its estimated production output of 230,000 metric tonnes (ICCO, 2014). The country was in the fourth position, until 2016 when Nigeria dropped to seventh position with an estimated production of 190,000 metric tonnes (ICCO 2016).

Technology has been the major driving force for increasing cocoa production in the world but yet Nigeria is not yet maximizing its income from cocoa production as most of the beans are sold unprocessed (ICCO 2016). Salami (2016) identified seven functional cocoa processing companies out of a total of seventeen cocoa processing companies in some parts of the cocoa producing states in Nigeria. The processing firms have many problems such as inadequate working capital, irregular power supply, high cost of cocoa beans, and sometimes obstructive government policies (ICCO, 2014). The application of technology in cocoa processing as really helped the functioning Nigerian cocoa processing firms by facilitating technology transfer and also stimulates local economies of host communities and states (Olowolaju, 2014). The study therefore seeks to determine the factors influencing technology investment decision in cocoa processing operations by providing answer to the constraints of cocoa farmers had in modern technology investment for cocoa post-harvest activities

Review of Literature

Conceptual clarifications

Cocoa processing technology could be defined as the total stock of knowledge including traditional skills necessary for cocoa production, processing and marketing (Laryea, 1981). Technology is designed to make the production of product or service more efficient (Ghosh, 2004). Krajewski & Ritzman (1999) defined technology to be the know-how, physical things, and procedures used to produce products and services. Schonberger & Knod (1997) viewed technology as principles, techniques, equipment, mechanics, policies, employed in creating or attaining the goods or services for better production. Technology is the application of knowledge for practical purpose, which is generally used to improve the condition of human and natural environment and carry out some other socio-economic activities. It is a complex combination of material processes and knowledge. Technology has made pertinent contributions to national development and its usefulness has attained global recognition.

Cocoa involves technology and skill for processing operation which help in enhancing its production in return. After harvesting, cocoa processing plant aids the transformation of cocoa beans into three main component which are cocoa liquor, cocoa butter and cocoa powder. These components can be used to make different products. Cocoa liquor is used with other ingredients to produce chocolate. Chocolate is used as a product on its own or combined with other ingredients to further produce confectioneries. While cocoa butter is used in the manufacture of chocolate. It is also widely used in cosmetic products such as moisturizing creams and soaps and can be used as an ingredient to support many food production. For instance, it is used in chocolate flavored drinks, chocolate flavored desserts such as ice cream and mousse, chocolate spreads and sauce. The main machinery required for cocoa processing are cleaning equipment (screening and washing), drum roaster, willowing machine, roller mill, hydraulic press, kneaders, mixers and pulverize.

International Cocoa Organization, ICCO (2010) identified the steps involved in cocoa processing operation from it crude to finish stage as following;

i. The cocoa beans are cleaned to remove all extraneous material.
ii. To bring out the chocolate flavor and color the beans are roasted. The temperature, time and degree of moisture involved in roasting

depend on the type of beans used and the sort of chocolate or product required from the process.

iii. A winnowing machine is used to remove the shells from the beans to leave just the cocoa nibs.

iv. The cocoa nibs undergo alkalization, usually with potassium carbonate, to develop the flavor and color.

v. The nibs are then milled to create cocoa liquor (cocoa particles suspended in cocoa butter). The temperature and degree of milling varies according to the type of nib used and the product required.

vi. Manufacturers generally use more than one type of bean in their products and therefore the different beans have to be blended together to the required formula.

vii. The cocoa liquor is pressed to extract the cocoa butter leaving a solid mass called cocoa press cake. The amount of butter extracted from the liquor is controlled by the manufacturer to produce press cake with different proportions of fat.

viii. The processing now takes two different directions. The cocoa butter is used in the manufacture of chocolate. The cocoa press cake is broken into small pieces to form kibbled press cake which is then pulverized to form cocoa powder.

ix. Cocoa liquor is used to produce chocolate through the addition of butter. Other ingredients such as sugar, milk, emulsifying agents and cocoa butter equivalents are also added and mixed. The proportion of the different ingredients depends on the type of chocolate being made.

x. The mixture then undergoes a refining process by traveling through a series of rollers until a smooth paste is formed. Refining improves the texture of the chocolate.

xi. The next process, couching, further develops flavor and texture. Couching is a kneading process. The speed, duration and temperature of the kneading affect the flavor. An alternative to couching is an emulsifying process using a machine that works like an egg beater.

xii. The mixture is then tempered or passed through a heating, cooling and reheating process. This prevents discoloration and fat bloom in the product by preventing certain crystalline formations of cocoa butter developing.

xiii. The mixture is then put into moulds or used for enrobing fillings and cooled in a cooling chamber.

xiv. The cocoa butter, Cocoa powder and liquid chocolate are packed in suitable containers and stored.

Empirical review on the need for Technology Investment

Agriculture accounts for about one third of the Gross Domestic Product (GDP) and employs about two-third of the labor force (Ekpo & Umoh, 2012; Noko, 2016). It is obvious that tree crops such as notably cocoa, oil palm and rubber have largely led agricultural export in Nigeria (Oguntade, Okafor, Mafimisebi & Fatunmbi 2011), and cocoa still continues in this role as described as the single agricultural export commodity that has earned foreign exchange more than other crops (Dongo, Aigbekaen, Jayeola, Emaku & Orisajo 2009). The crop also offers employment to many people, both directly and indirectly, and serves as an important source of raw materials and revenue to governments of cocoa producing states (Fadipe, Adenuga & Ilori 2012). It is also the largest non-oil export earner, a key contributor to wealth creation and poverty reduction, and one of the largest employers of labor (NEPC 2016; Central Bank of Nigeria, 2015).

Olowolaju (2014) stated that Nigeria used to rank as one of the leading cocoa producing countries in West Africa and no single agricultural export commodity has earned more than cocoa. With respect to employment, the cocoa sub-sector still offers quite a sizeable number of employments both directly and indirectly. In addition, cocoa is an important source of raw materials, as well as source of revenue to governments of cocoa producing states. With the gradual increase in cocoa production, there is a need for investment in up-to-date technology for the processing of the dry cocoa bean to ensure effective value addition. Agriculture is of low benefit if there is no adequate investment in the agro processing. The real Gross Domestic Product (GDP) cannot grow if a country merely produces massive agricultural products which cannot be exploited for domestic use and exportation (Christianto & Smaranlanche, 2008). The development of cocoa processing industries is very important to the employment generation in Nigeria. A situation where bulk of the cocoa beans produced in a country cannot be processed locally or at least have some value added, is not in the best interest of any country. Investment in technology is necessary for the growth of every sector of the economy most especially cocoa -processing which is the bedrock of the economies of some states in southwestern Nigeria. Only about 17% of Nigeria annual cocoa production of about 250,000 tonnes are processed locally, whereas Cote Di'voire, Ghana and Indonesia with annual production of about 1.38 million tonnes, 690,000 tonnes and 570,000 tonnes processed locally 34%, 46% and 33 % respectively, of their annual cocoa production (Cocoa Barometer, 2009).

Olowolaju (2014) assessed the investment in technology in cocoa processing industry in Nigeria. His findings revealed that despite the substantial investment in technology by cocoa processing companies, there were low capacity utilizations in the industry due to lack of adequate working capital to stock pile cocoa beans. Nkang, Ajah, Abang and Edet (2009) examined costs and returns in cocoa production in Cross River State by comparing three identified management systems of cocoa production in the study area. Their study established that investments in cocoa production can be increased by providing expanded access to cheap and flexible credit and land, which have presented as limiting factors in cocoa production.

Fadipe, Adenuga and Ilori (2012) examined the economics of cocoa production in Oyo state, Nigeria. Their result showed that farm size, access to credit and Farm age were significant factors affecting the output of cocoa production.

Osarenren, Ejuetueyin, and Eweka (2016) examined the socio-economic characteristics of registered cocoa farmers in Edo State; Nigeria. Results showed that inadequate finance to operate on large scale was found to be the major constraint to the cocoa farmers in the study area. Akintelu et al. (2018) examined the cocoa production technologies adopted by cocoa farmers in Kogi state, Nigeria. Their study revealed that production technologies adopted by cocoa farmers in Kogi state are significant with a coefficient of 0.68 to cocoa production output among farmers. This indicates that production technologies has led to quality of output and improved farm practices in the state.

Theoretical framework

Theory is an abstract statement that explains the relationship between two or more variables. It gives a clear understanding of observed phenomena in the natural world and addresses both empirical and conceptual problems. In an attempt to justify the relationship that exists between Technology investment decision and the constraint of it adoption. This study is justified by Development theories as stipulated by Kingsbury et al. (2012).

Development in general is concerned with how countries can improve the living standards of their citizens, as well as how to construct a political and social environment where such material benefit can take place (Kingsbury

et al. 2012). The development theories focused on the policies guiding method of formulating and implementing domestic markets as a way of facilitating development. The nation-state is usually seen as the key actor in the development of theories (Kingsbury et al. 2012). The findings of Kingsbury et al. (2012) identified modernisation, dependency and neoliberalism theory has the schools of development theory which have dominated since the late 1950s. Modernisation and dependency theory focused on the key roles of governments, while neoliberalism focused on the power of markets to deliver benefits of development more effectively than governments.

The central tangent of Modernisation theory is to achieve a modern standard of living for all nations through implementation of correct policies (Kingsbury et al. 2012). Domestic savings supported by foreign investment are needed to achieve the modern standard of living which would fuel the local economy. Modernisation theory embraced earlier classical economic theories that labour would migrate from low-wage areas to areas where rewards were higher. On the other hand, capital would move in the opposite direction as returns on investments would be higher in underdeveloped areas as investment potential was high in these areas (higher growth potential).

Methodology

The study obtained information with the use of primary source. The primary source was with the use of questionnaire. The questionnaire was design to contain structured questions and the responses were rated appropriately. The questionnaires sought out the background information about the respondent and elicits information on factors influencing investment decisions in technology in cocoa processing operations.

The population of the study includes one hundred and thirty (130) cocoa processing farmers in Ona-Ara Local Government of Oyo state, Nigeria. The selection was based on the fact that Oyo state houses the research institute in the south west, Nigeria.

Primary and Secondary Data Sources were employed. One hundred and eight (108) questionnaires was administered on the selected farmers in Oyo state using purposive sampling techniques. Both descriptive and inferential statistical methods were used for data analysis. Descriptive statistical

methods include frequency counts and percentages used to analyzed socio-geographical characteristics of the respondents and while correlation analysis was used as inferential statistic.

Data Presentation, Analysis and Interpretation

The focus of this section is on the presentation, analysis and interpretation of the data collected from respondents' profile.

Socio-Demographic Characteristics of Respondents

Table 1 below shows the respondents socio-demographical characteristics. The result revealed that majority 100 (92.6 %) of cocoa farmers sampled were male. The farmers age was majorly age 41 to age 60 (55.6%) The marital status showed that 96 (88.9 %) of cocoa farmers are married. The academic qualification of the farmers indicated that most of the farmers 53 (49.17%) had S.S.C.E follow by those who had no formal education 28 (25.9 %) while others are as follows: OND/HND 21 (19.4%), B.Sc./B.Tech 6 (5.6%). Most of the farmers are from Oyo state 96 (88.9%), of Ona-ara local government Ibadan, Oyo state respectively and the majority 86 (79.6%) of them are full time farmers (Table 1).

The result in Table 1 indicates that more male farmers are involved in coca processing in Oyo state, farmers that engaged in cocoa processing in Oyo state are aged people, the educational level of these farmers range from SSCE to no formal education with a very low rate of literacy level and most of the farmers practices full time farming. This result shows that age of farmers and their educational level are critical factors that can influence technology investment decision of these farmers. The literacy level and age of farmer also affect the level of productivity, especially, in cocoa processing operations. Knowledge of technology usage is important to technology adoption which can be achieved through education. Although, Olowolaju's (2014) work revealed that men actively participated in cocoa processing than female counterpart. Oluyole and Sanusi, (2009) discovered that most cocoa farmers had secondary education and those with other source of income were mainly farmers with low productivity. Emphasis were not given to the existing relationship in age of farmers and level of productivity. However, this findings corroborate the study of Aneani, Anchirinah, Owusu-Ansah and Asamoah, (2012) which established that adoption of cocoa production technologies is affected by age of the farmer and educational status. Akintelu et al. (2019) also established that there is low literacy level among cocoa

farmers in Kogi Sate with SSCE as the most farmers' certificate and are aged farmers.

Table 1: Socio-demographic characteristics of respondents

Parameters	Classification (n= 134)	Frequency (%)
Sex	Male Female	100 (92.6) 8 (7.4)
Age	21-30 31-40 41-60 61 and above	7 (6.5) 36 (33.3) 60 (55.6) 5 (4.6)
Marital status	Married Single Divorced Widow	96 (88.9) 7 (6.5) 1 (.9) 4 (3.7)
Academic qualification	No formal education S.S.C.E. OND/HND B.Sc./B.Tech	28 (25.9) 53 (49.1) 21 (19.4) 6 (5.6)
State of origin	Ogun state Oyo state Ekiti state Osun state	2 (1.9) 96 (88.9) 3 (2.8) 7 (6.5)
Farmers practice	Full time farmers Civil servant Trading	86 (79.6) 12 (11.1) 10 (9.3)
Total		108 (100)

Source: Field survey, 2018

Factors influencing technology investment decision in cocoa processing operations

The result in Table 2 shows that 66.7% of the cocoa farmers indicated that investment decisions is affected by the political trend while the 33.3% of the investment decision of the cocoa farmers is affected by political trend. In the same table, 63.9% of the farmers admitted that their investment decision is affected by social trend, while the remaining 36.1% admitted their investment decision of the cocoa farmers is not affected by social trend 71.3% of the farmers also see consumer trend as the main determinant of their investment decision, the remaining 28.7% disagreed. Evidence from the

table further show that 60.0% of the farmers affirmed that supplier bargaining power affects their investment decision.

In addition, 63.9% of the farmers agreed that market competition influenced their investment decision while the remaining 36.1% of the farmers disagreed. The investment decision of 63.9% of the cocoa farmers is affected by the production process while 36.1% of the investment decision of the cocoa farmers is affected by production process. In the same table, 71.3% of the farmers admitted that their investment decision is affected technological change while the remaining 28.7% admitted their investment decision of the cocoa farmers is not affected by technological change. 42.6% of the farmers also see power supply as the main determinant of their investment decision, the remaining 28.7% disagreed. On the same table, 42.7% of the farmers affirmed that government policy affect their investment decision, the remaining 57.3% of the farmers disagreed. In addition, 79.6% of the farmers agreed that human resources influenced their investment decision while the remaining 20.4% of the farmers disagreed.

Lastly, 77.8% of the farmers acknowledged funding as the main determinant of their investment decision, the remaining 22.2% of the farmers did not acknowledge funding.

In all, the result indicated that power supply has minimal influence on farmers' technology investment decision in cocoa processing operations. However, while other factors are seem to influence technology investment decision by the farmers, Political trend, social trend, consumer trend, market competition, improved production process, technology change, human resource and funding are shown to have much influence on farmers technology investment decision in cocoa processing operation. The implication that processing technology is highly capital intensive and cocoa processing required huge funding for technology investment.

Table 2 factors influencing technology investment decision in cocoa processing operations

Variables	SA	A	U	D	SD	Mean
Political trend	45(41.7)	27(25.0)	16(14.8)	15(13.9)	5(4.6)	3.83
Social trend	13(12.0)	55(50.9)	26(24.1)	13(12.0)	1(.9)	3.57
Consumer trend	24(22.2)	53(49.1)	15(13.9)	11(10.2)	5(4.6)	3.70
Supplier bargaining power	12(11.1)	52(48.1)	16(14.8)	16(14.8)	12(11.1)	3.29

Market competition	34(31.5)	46(42.6)	22(20.4)	3(2.8)	3(2.8)	3.93
Improve production process	18(16.7)	51(47.2)	28(25.9)	8(7.4)	3(2.8)	3.62
Technology change	23(21.3)	54(50.0)	20(18.5)	10(9.3)	1(.9)	3.79
Power supply	20(18.5)	26(24.1)	14(13.0)	34(31.5)	14(13.0)	3.00
Government policy	21(19.4)	36(33.3)	22(20.4)	19(17.6)	10(9.3)	3.32
Human resources	35(32.4)	51(47.2)	15(13.9)	4(3.7)	3(2.8)	3.93
Funding	58(53.7)	26(24.1)	19(17.6)	5(4.6)	-	4.06

Source: field survey, 2018

Correlation analysis result of factors influencing technology investment decision on cocoa processing operations.

The relationship between cocoa processors' decision to invest in new technologies and the factors influencing these decisions is presented in Table 3.

The factors that are expected to influence farmers' investment decision include political trend, social trend, consumer trend, supplier bargaining power, and market competition. Others include improve production, technological change, power supply, government policy as well as human resource, and funding. The result reveals that the decision by cocoa processors to invest in new machinery is influenced by the availability of power supply ($r = 0.271$; $p<0.01$) and funding ($r = -0.312$; $p<0.05$). Adetunji et al. (2007) established that the technology is essential for cocoa processing operation. However, insufficient fund is seen critical to cocoa production technologies in Nigeria. Osareme et al. (2016) study also shows that inadequate funding is a major constraint for cocoa farmers to adopt processing technology.

Also, the result shows that investment in thermometer by cocoa farmers is influenced by power supply ($r = 0.247$; $p<0.01$), the need to improved production ($r = -0.194$; 0.05) as well as funding ($r = -0.334$; $p<0.01$). In additional, investing in fork lift technology is significantly influenced by market competition ($r = 0.193$; $p<0.05$); social trend ($r = -0.190$; $p<0.01$), supplier bargaining power ($r = -0.272$; $p<0.005$); and unfavorable government policy ($r = -0.225$; $p<0.05$). This is an indication that the use of fork lift by

farmers is influenced by social trend, supplier bargaining power, market competition and whatever policy is adopted by the government.

Similarly, the result shows that market competition ($r = 0.267$; $p<0.01$) and funding ($r = 0.413$; $p < 0.05$) have significant positive relationship with the farmers' decision to invest in drying technology. This implies that nature of the market and funding have greatly influenced the decision to invest in drying technology.

Also, the result reveals that political trend ($r = 0.194$; $p<0.05$), supplier bargaining power ($r = 0.212$; $p<0.05$), market competition ($r = 0.330$; $p<0.01$), improve production ($r = 0.298$; $p<0.01$), and human resource ($r = 0.259$; $p<0.01$) are positively influencing cleaning technology investment decision by the cocoa farmers. This indicates that political environment, the nature of the supplier and market, improved production, availability of human resources and adequate funding are factors influencing farmers to invest on cleaning technology. This shows that political trend, supplier bargaining power, improve production and human resource play critical role in the development of cocoa. Human resource specifically occupies the center of production, distribution and consumption chain (Crafts, 2003).

The table further shows that farmers' decision to invest in grading technology is positively influenced by market competition ($r = 0.293$; 0.01) and funding ($r = 0.471$; 0.01). This implies that decision for cocoa farmers to invest grading technology is determined by the nature of the market and availability of fund.

Furthermore, the result shows that investment decision on Break winnowing technology is influenced by market competition ($r= 0.232$; $p<0.01$, Human resource ($r=0.3114$ $p<0.05$) and funding ($r=0.553$; $p<0.05$). This means that the nature of the market and availability of resources and availability of fund contribute to the decision to invest in break winnowing technology. The result finally shows that Germ free nib is influenced by market competition ($r=0.427$; $p<0.05$). IT can be seen that the decision to invest in germ free nib is significantly influenced by market competition this implies that the nature of the market influenced the decision of the farmers.

Table 3: Correlation Analysis

VARIABLES	1	2	3	4	5	6	7
Political trend	R=0.067 (0.488)	R=0.081 (0.407)	R=0.149 (0.124)	R=0.194* (0.045)	R=0.060 (0.536)	R-0.036 (0.711)	R=0.055 (0.575)
Social trend	R-0.032 (0.744)	R-0.190 *(0.048)	R=0.042 (0.666)	R=0.188 (0.052)	R-0.091 (0.350)	R=0.138 (0.156)	R=0.143 (0.141)
Consumer trend	R=0.147 (0.130)	R=0.100 (0.304)	R=0.168 (0.082)	R=0.182 (0.060)	R-0.034 (0.727)	R=0.022 (0.819)	R=0.060 (0.535)
Supplier bargaining power	R=0.016 (0.872)	R-0.272 **(0.004)	R-0.117 (0.227)	R=0.212 *(0.028)	R-0.139 (0.152)	R=0.073 (0.453)	R=0.007 (0.945)
Market competition	R-0.109 (0.260)	R=0.193 *(0.045)	R=0.267 **(0.005)	R=0.330 **(0.000)	R=0.293 **(0.002)	R=0.232*(0.016)	R=0.427 **(0.000)
Improve production	R-0.194 *(0.045)	R-0.040 (0.680)	R=0.126 (0.194)	R=0.298 **(0.002)	R=0.162 (0.095)	R=0.157 (0.104)	R=0.047 (0.632)
Technological change	R-0.069 (0.475)	R=0.019 (0.843)	R=0.148 (0.126)	R=0.141 (0.144)	R=0.073 (0.455)	R=0.138 (0.155)	R=0.012 (0.902)
Power supply	R=0.247 **(0.010)	R=0.160 (0.098)	R=0.096 (0.321)	R-0.053 (0.584)	R-0.003 (0.972)	R-0.138 (0.155)	R-0.059 (0.542)
Government policy	R-0.094 (0.334)	R-0.225 *(0.019)	R=0.018 (0.852)	R=0.165 (0.088)	R-0.020 (0.840)	R=0.154 (0.112)	R=0.040 (0.684)
Human resources	R-0.115 (0.234)	R-0.070 (0.471)	R=0.074 (0.448)	R=0.259 **(0.007)	R=0.115 (0.237)	R=0.314** 0.001)	R=0.136 (0.160)
Funding	R-0.334 **(0.000)	R=0.039 (0.692)	R=0.413 **(0.00)	R=0.224 **0.020)	R=0.471 **(0.00)	R=0.553**(0.00)	R=0.084 (0.386)

Key: Thermometer = 1, Fork lift = 2, Drying = 3, Cleaning = 4, Grading = 5, Break winnowing = 6, Germ free nib = 7

Discussion of Findings

In summary, the result shows that supplier bargaining power, market completion, improve production, power supply, human resource and funding are important factors influencing technology investment decision of farmers in cocoa processing operations. Access to funds was found to have a strong relationship with probability of farmers investing in cocoa processing technologies. This is an indication that funding is a facilitating factors for farmer's investment decision in cocoa processing technologies. This is consistent with the view that credit facility greatly influenced the decision to adopt modern agricultural production technologies by farmers in Ghana (Mamudu et al., 2012). Olowolaju (2014) also established that funding, power supply, improve production and human resource were very important factors for technology investment decision in cocoa processing.

Conclusion and Recommendations

Conclusion

The findings from the study shows that the factors influencing technology decision were funding, human resources, market competition, political trend, technology change, consumer trend, and improve production process. Also the correlation analysis result shown that access to funds was found to have a strong relationship with probability of farmers investing in cocoa processing technologies. Findings also shows that access to funds was found to have a strong relationship with probability of farmers investing in cocoa processing technologies.

Recommendations

Base on the findings, the following recommendations were made;

i. It is recommended that special consideration should be given to cocoa processors through specialized financial institutions or models in order to give leverage to the cocoa processors to afford the funding required to acquire machineries that would enhance production capacity of the cocoa farmers.
ii. Developmental support agencies are enjoined to offer proper education on technology adoption required for cocoa processing as farmers have different technological requirements for business operations and the understanding of appropriate technology is

paramount for efficient deployment of the technologies for operations.

iii. Cocoa processors need to stay competitive in terms of product offering as the market for cocoa remains demand driven as it has been established that grading technology is influenced by market forces and competition.

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